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Paper 64
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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KAISER ALUMINUM,
Petitioner,

v.

CONSTELLIUM ROLLED PRODUCTS RAVENSWOOD, LLC,
Patent Owner.

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Case IPR2014-01002
Patent 7,229,509 B2

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Before MICHAEL P. TIERNEY, DONNA M. PRAISS, and JO-ANNE M. KOKOSKI, *Administrative Patent Judges.*

KOKOSKI, *Administrative Patent Judge.*

# FINAL WRITTEN DECISION
*35 U.S.C. § 318(a) and 37 C.F.R. § 42.73*

# I. INTRODUCTION

Kaiser Aluminum ("Petitioner") filed an Amended Petition (Paper 4, "Pet.") to institute an *inter partes* review of claim 10 of U.S. Patent No. 7,229,509 B2 ("the '509 patent," Ex. 1001). On December 29, 2014, we instituted an *inter partes* review of claim 10 on three grounds of unpatentability (Paper 11, "Dec. on Inst."). Constellium Rolled Products Ravenswood, LLC ("Patent Owner") filed a Corrected Patent Owner Response (Paper 36, "PO Resp."). Petitioner filed a Reply (Paper 43, "Reply").

An oral hearing was held on September 30, 2015. A transcript of the hearing is included in the record. Paper 63.

We have jurisdiction under 35 U.S.C. § 6(b). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has not shown by a preponderance of the evidence that claim 10 of the '509 patent is unpatentable.

## *A. The '509 Patent*

The '509 patent, titled "Al-Cu-Li-Mg-Ag-Mn-Zr Alloy for Use as Structural Members Requiring High Strength and High Fracture Toughness," is directed to aluminum-lithium based alloy products displaying a combination of high strength and high fracture toughness. Ex. 1001, 1:15–22; Abstract. The Specification states that the claimed alloys are particularly suitable for use in aircraft construction. *Id*. at 2:11–13. The claimed alloys contain specified weight percentage amounts of copper, lithium, magnesium, silver, manganese, and zirconium, and exhibit "an improved combination of

strength and fracture toughness, over virtually any thickness range." *Id*. at 2:27–36.

As originally issued, claim 10 depended from claim 1. In November 2011, Patent Owner disclaimed claims 1–9 and 11–16 of the '509 patent. Claim 10, written in independent form, reads as follows:

> 10. A rolled product comprising an aluminum alloy, having improved strength and fracture toughness, said alloy comprising the following alloying elements added thereto:
>
> Cu: 2.5-4.0 wt. %
>
> Li: 0.8-2.5 wt.%
>
> Mg: 0.2-1 wt.%
>
> Ag: 0.2-0.8 wt.%
>
> Mn: 0.2-0.8 wt.% and
>
> Zr: 0.05-0.3 wt.%;
>
> and wherein the balance is Al and normal and/or inevitable elements and impurities, with a thickness of at least about 3 inches, exhibiting in a solution heat-treated, quenched, stress-relieved and artificially aged condition, at least one set of properties selected from the group consisting of:
>
> (a) UTS (L)>70 ksi (482.6 MPa) and $K_{IC}$(L-T)>34 ksi√inch (37.4 MPa√m),
>
> (b) TYS (L)>65 ksi (448.2 MPa) and $K_{IC}$(L-T)>34 ksi√inch (37.4 MPa√m),
>
> (c) UTS (LT)>70 ksi (482.6 MPa) and $K_{IC}$(T-L)>27 ksi√inch (29.7 MPa√m),
>
> (d) TYS (LT)>62 ksi (427.5 MPa) and $K_{IC}$(T-L)>26 ksi√inch (28.6 MPa√m),
>
> (e) UTS (ST)>70 ksi (482.6 MPa) and $K_{IC}$(S-T)>24 ksi√inch (26.4 MPa√m) and

(f) TYS (ST)>60 ksi (413.7 MPa) and $K_{IC}$(S-T)>23 ksi√inch (25.3 MPa√m).

Pet. 17–18; Prelim. Resp. 3–4.

*B. Prior Art*

The pending grounds of unpatentability in this *inter partes* review are based on the following prior art:

Balmuth, et al., U.S. Patent No. 5,234,662, issued August 10, 1993 ("'662 Balmuth," Ex. 1005).

Pickens, et al., U.S. Patent No. 5,211,910, issued May 18, 1993 ("'910 Pickens," Ex. 1012).

Balmuth and Cho, *Fracture and Fatigue Crack Growth Resistance of Recrystallized Al-Li Alloys*, MATERIALS SCIENCE FORUM VOLS. 217–222, 1365–1370 (1996) ("Balmuth1," Ex. 1010).

E. A. Starke, Jr., ed., *NASA-UVa Light Aerospace Alloy and Structures Technology Program: Aluminum-Based Materials for High Speed Aircraft*, January 1, 1993–June 30, 1993 Semi-Annual Report (1996) ("Starke Reference," Ex. 1011).

*C. Pending Grounds of Unpatentability*

This *inter partes* review involves the following grounds of unpatentability:

| Reference(s) | Basis |
|---|---|
| Balmuth1 | § 103 |
| Starke Reference | § 103 |
| '662 Balmuth and '910 Pickens | § 103 |

Dec. on Inst. 15–16.

## II. ANALYSIS

*A. Claim Interpretation*

We interpret claims of an unexpired patent using the "broadest reasonable construction in light of the specification of the patent in which [the claims] appear[]." 37 C.F.R. § 42.100(b). Under this standard, claim

terms are given their ordinary and customary meaning in view of the specification, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

For purposes of our Decision to Institute, we determined that the terms in the challenged claims did not need to be construed expressly, and we see no reason to modify that determination in light of the record developed at trial.

*B. References*

*1. Overview of Balmuth1*

Balmuth1 describes testing conducted to evaluate four Al-Cu-Li-Mg-Ag-Mn-Zr alloys with varying Cu/Li ratios. Balmuth1, Abstract and Table 1. According to Balmuth1, alloys with lower lithium concentrations provide a combination of mechanical properties (such as strength, toughness, and fatigue resistance) that are needed for use in aircraft applications. *Id*. at Introduction. Balmuth1 states that magnesium and silver "were added to optimize the strength-toughness properties," and that "Ag additions to Al-Cu-Li-Mg alloys result in high resistance to stress-corrosion." *Id*. at Materials. Balmuth1 further states that manganese reduces anisotropy and increases the ease of recrystallization, and that zirconium controls grain structure. *Id*. Table 1 of Balmuth1 is reproduced below:

**Table 1. Experimental Sheet Alloy Compositions, weight percent.**

| Alloy No. | Cu | Li | Mg | Ag | Mn | Zr | Al |
|---|---|---|---|---|---|---|---|
| 1 | 3.3 | 1.4 | 0.41 | 0.31 | 0.32 | 0.12 | Rem. |
| 2 | 3.6 | 0.97 | 0.40 | 0.34 | 0.32 | 0.12 | Rem. |
| 3 | 3.6 | 0.77 | 0.30 | 0.31 | 0.32 | 0.11 | Rem. |
| 4 | 4.5 | 0.34 | 0.44 | 0.39 | 0.24 | 0.09 | Rem. |

Table 1 sets forth the compositions of the alloys studied in Balmuth1. *Id*.

Balmuth1 measured the fatigue crack growth rates of 2.3 mm sheets of each of the four alloys described in Table 1 in the L-T and T-L orientations. *Id*. at Materials, Experimental. Balmuth1 states that "[f]racture toughness values for each of the four alloys were much higher than for conventional alloys" and that "these alloys could be readily formulated with higher Cu or Li to achieve higher strength without a tradeoff for useful toughness." *Id*. at Discussion. Balmuth1 concludes that "[a] minimum Li:Cu ratio of 0.2 may be required to attain optimum fatigue crack growth resistance." *Id*. at Conclusions.

*2. Overview of the Starke Reference*

The Starke Reference describes testing performed on a number of alloy variants, including alloy composition 66937, with the following composition:

| | Cu | Li | Mg | Ag | Zr | V | Mn |
|---|---|---|---|---|---|---|---|
| 66936(target) | 3.5 | 1.0 | .4 | .4 | .16 | -- | -- |
| (actual) | 3.42 | 1.02 | .39 | .42 | .17 | -- | -- |
| 66937(target) | 3.5 | 1.0 | .4 | .4 | .16 | -- | .3 |
| (actual) | 3.50 | 1.0 | .41 | .43 | .18 | -- | .32 |

Ex. 1011, 58–59. Based on testing performed on 0.090" sheets, the Starke Reference states that materials with recrystallized microstructures with low Li content, such as 66937, "would be favored for higher fracture toughness applications at a medium strength level." *Id*. at 61. The Starke Reference further states that 66937 (containing Zr and Mn) achieved the highest fracture toughness. *Id*. at 62.

*3. Overview of '662 Balmuth*

'662 Balmuth is directed to aluminum-based alloys. Ex. 1005, Abstract. According to '662 Balmuth, the described aluminum-based alloys containing "specific and critical amounts of lithium, copper and preferably manganese and optionally magnesium and minor amounts of grain refining elements" provide low-density, high-strength alloys for use in aerospace and aircraft components. *Id*. at 3:61–67. '662 Balmuth identifies zirconium as a grain refinement element that can be used in the disclosed compositions. *Id*. at 4:18–19. '662 Balmuth states that the amounts of each component are "critical and essential" to provide the desired low-density, high-strength properties. *Id*. at 4:56–60. '662 Balmuth further states that the disclosed combination of alloying elements, when processed into components such as

a plate, "have good combinations of low density, strength, toughness, fatigue resistance and corrosion resistance." *Id*. at 4:61–66.

Example 2 in '662 Balmuth sets forth the results of tests done to determine the effect of aging and heat treating on the mechanical properties of a plate having a thickness of 3.6 inches, compared to one having a thickness of 1.5 inches. *Id*. at Example 2, 17:33–22:10. '662 Balmuth states that the testing of the 3.6-inch plate shows that "strength/toughness goals are achievable" with the alloy tested. *Id*. at 21:13–15.

*4. Overview of '910 Pickens*

'910 Pickens is directed to aluminum-based alloys containing copper, lithium, magnesium, silver, and at least one other element. Ex. 1012, 1:6–10. The disclosed alloys possess "extremely desirable properties" such as high artificially-aged strength, strong natural aging response, high strength/ductility combinations, and low density, and "are particularly suited for aerospace, aircraft, armor, and armored vehicle applications." *Id*. at 1:12–21. '910 Pickens states that the use of Mg enhances nucleation and increases strength at concentrations between 0.05 and 3 percent. *Id*. at 12:12–30. '910 Pickens further states that the use of Ag achieves highest strengths at concentrations between 0.1 and 0.4 percent. *Id*. at 12:33–35.

*C. Analysis of Grounds of Unpatentability*

Petitioner asserts that claim 10 is unpatentable under 35 U.S.C. § 103 over (1) Balmuth1 (Pet. 19–26; Reply 1–10); (2) the Starke Reference (Pet. 26–32; Reply 1–10); and (3) the combination of '662 Balmuth and '910 Pickens (Pet. 32–59; Reply 9–16). Petitioner explains how the cited references allegedly disclose or suggest the claimed subject matter, and also relies on the Declaration of Edward S. Balmuth ("Balmuth Declaration,"

Ex. 1006), and the Declaration of Edgar A. Starke, Jr. ("Starke Declaration," Ex. 1008). Patent Owner disagrees with Petitioner's assertions and relies on the Declarations of Timothy Warner, Ph.D. (Exs. 2042 and 2050), the Declaration of Dr. Joseph R. Pickens ("Pickens Declaration," Ex. 2043), and the Declaration of Peter Reinhard Zobrist (Ex. 2044). PO Resp. 8–45.

To prevail on its patentability challenge, Petitioner must establish facts supporting its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). A claim is unpatentable under 35 U.S.C. § 103 if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). A party that petitions the Board for a determination of obviousness must show that "a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so." *Procter & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (citing *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)).

Petitioner contends that a person having ordinary skill in the art would predict that an aluminum alloy with the claimed chemistry (such as the thin sheets described in Balmuth1 and the Starke Reference) would inherently have the claimed properties when formed as a plate with a thickness of at least 3 inches. Pet. 26, 31. In support of this contention, Mr. Balmuth testified that "[s]ince a 'plate' is just thicker 'sheet,' the 'plate' size section

could be at whatever size desirable, including 3 inches thickness or greater, and would inherently have the properties necessitated by the chemistry and processing involved." Ex. 1006 ¶ 13. Petitioner also relies on Dr. Starke's testimony that

> [t]he mechanical properties of an aluminum alloy are based on the chemistry and processing conditions. Because of the improved strength and fracture toughness properties found in the thin sheets tested in the Balmuth1 reference and the Starke reference, one of ordinary skill in the art would expect similar improvements in thicker plates using routine testing equipment known to those of ordinary skill in the art. The mechanical properties would be inherent in the thicker plate because of the addition of Ag and Mn that are known to improve strength and fracture toughness.

Ex. 1008 ¶ 32.

Petitioner further contends that a person having ordinary skill in the art would have predicted "that a thick plate aluminum alloy as known in the '662 Balmuth patent would have improved properties upon the addition of Ag/Mg as taught by the '910 Pickens patent" and that "[t]hese improved properties would be inherent and/or predictable." Pet. 41. In support of this contention, Petitioner relies on Mr. Balmuth's testimony that "[i]t would have been a matter of routine testing to make the alloy composition and test for the properties, which would have been inherent in the chemistry and processing steps involved." Ex. 1006 ¶ 20.

Patent Owner argues that Petitioner has not established that the claimed properties necessarily would be present in the alloys described in Balmuth1 (PO Resp. 13–14), the Starke Reference (*id.* at 34–35), or by the combination of '662 Balmuth and '910 Pickens (*id.* at 37–40, 42–44). Patent Owner notes that "Mr. Balmuth testified in his deposition that

although some of the claimed properties, such as toughness in the S-T direction, can be measured in plate applications, '[y]ou don't have the ability to test it and you don't have any interest in what its property is . . . [in sheet applications].'" *Id.* at 14 (citing Ex. 2029, 50:16–51:5). Patent Owner states that "Dr. Pickens testified that 'plate is not simply thicker sheet' and that there are numerous complex differences between a sheet alloy and a product with a 'thickness of at least about 3 inches.'" *Id.* at 15 (citing Ex. 2043 ¶ 11). Patent Owner further notes that "Mr. Balmuth admitted in his deposition that his statement . . . that 'plate is just thicker sheet' was an 'oversimplification.'" *Id.* at 9 (citing Ex. 2029 13:7–11). Patent Owner also relies on Dr. Pickens's testimony to rebut Dr. Starke's contention that an alloy showing improved properties in a thin plate with the addition of Ag/Mg and Mn would have similar properties in a thick sheet having the same chemistry:

> Dr. Pickens explains that the result of an Ag and/or Mg addition "would have been exceedingly difficult to predict" and that the Ag and/or Mg additions may be particularly problematic in thick plate applications. Dr. [Pickens] explains that ". . . it is difficult to predict whether the addition [of] Ag and Mg would be effective in the complex product form of thick plate, especially where the inverse relationship of strength and toughness is involved."

*Id.* at 12–13 (citing Ex. 2043 ¶¶ 57–59). Patent Owner contends that, "as confirmed by Dr. Pickens, the addition of Ag and/or Mg to any of the alloys of '662 Balmuth would have been expected to alter the properties of the alloy in an unpredictable way." *Id.* at 42.

Based on our review of the record, we find Patent Owner's arguments to be persuasive. In order to rely on inherency to establish the existence of a missing claim limitation in an obviousness analysis, "the limitation at issue

necessarily must be present, or the natural result of the combination of elements explicitly disclosed by the prior art." *PAR Pharma., Inc. v. TWI Pharmas., Inc.*, 773 F.3d 1186, 1195–96 (Fed. Cir. 2014). Neither Mr. Balmuth's nor Dr. Starke's statements regarding the inherent properties of a thick plate with the same chemistry as a thin sheet are supported by sufficient objective evidence or analysis demonstrating that the claimed properties would necessarily be present in the thick plate. Mr. Balmuth and Dr. Starke simply state that such a thick plate would inherently have the properties necessitated by the chemistry involved, without providing sufficient and credible explanations as to why that would be the case. *See* Ex. 1006 ¶ 13; Ex. 1008 ¶ 32. Mr. Balmuth, for example, states that "it is generally understood that the strength and fracture toughness properties of a plate are less than those of a sheet having similar chemistry," but that "one of ordinary skill in the art would predict improved properties for a plate upon a showing of improved properties in a sheet having similar chemistry," and does not expound upon the reasons why a person skilled in the art would understand that to mean that the thick plate would display the same mechanical properties as the thin sheet. *See* Ex. 1006 ¶ 14. Based upon the evidence presented, we find that the opinions of Mr. Balmuth and Dr. Starke are not persuasive as they are not supported by the evidence of record. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 294 (Fed. Cir. 1985) (stating a lack of objective support for an expert opinion "may render the testimony of little probative value in [a patentability] determination").

Patent Owner, in contrast, provides reasoning as to why a person having ordinary skill in the art would not have understood that a thick plate would have similar properties to a thin sheet having the same chemistry. PO Resp. 13–14, 34–35, 37–40, 42–44. For example, Patent Owner notes that

> since according to Mr. Balmuth you 'don't have the ability' or 'any interest' in measuring toughness in the S-T direction in sheet, Petitioner has not established that the strength and toughness properties in sheet would necessarily be predictive of the strength and toughness properties of plate, such as described in Claim 10.

*Id.* at 14. Dr. Pickens also testified to the complexities involved in developing thick plate aluminum-lithium alloys:

> For example, quench sensitivity, stress-corrosion cracking resistance, in plane anisotropy, through thickness heterogeneity, and lower short transverse fracture toughness are a few factors that make developing thick plate aluminum-lithium alloys very complicated. Furthermore, lithium lowers the thermal conductivity of aluminum which is problematic in several areas. Heat is more difficult to extract during direct-chill casting thereby exacerbating metallurgical segregation problems. Hot rolling can break down segregation, such as heterogeneous segregations at grain boundaries, so that it may be less harmful, although there is a practical limit on how thick aluminum alloy rolling ingot can be cast. The reduction ratio, i.e. scalped ingot thickness to final product gauge, is an important real-world processing variable when developing a thick plate aluminum lithium alloy.

Ex. 2043 ¶ 11; *see also* PO Resp. 16–17 (discussing the "recognition in the art of complex differences between sheet and thick plate"). Patent Owner further notes that Dr. Pickens testified "that he would not have been motivated to add Mn in the claimed amount to an Al-Cu-Li-Mg-Ag alloy with a thickness of at least about 3 inches, or scale up a sheet alloy to the

claimed thickness" because it was unclear, at the time of the '509 patent, that Mn would have had a beneficial impact on a thick plate Al-Cu-Li-Mg-Ag alloy. PO Resp. 18–19 (citing Ex. 2043 ¶ 20). We find Patent Owner's arguments that a person having ordinary skill in the art would not have expected a thick plate to have similar properties to a thin sheet having the same chemistry to be persuasive. *Id.* at 8–17, 35–37; *see Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010) (holding that Board has discretion to give weight to one item of evidence over another "unless no reasonable trier of fact could have done so.").

Petitioner's argument that "one of ordinary skill in the art would have predicted that increasing the thickness" of the alloy compositions described in the prior art "would have resulted in an alloy having the claimed properties through routine experimentation" is similarly unpersuasive. Pet. 29; *see id.* at 29–30, 38. Mr. Balmuth and Dr. Starke opine that one of ordinary skill at the time of filing would have tried to manufacture a thick plate with the claimed composition and properties because of a commercial need in the aerospace industry. *See, e.g.*, Ex. 1006 ¶ 14 ("It would have been 'obvious-to-try' to manufacture plates having a thickness of 3 inches or greater based on the success of the sheets taught in the Balmuth1 reference in combination with the commercial need for such thick-section Li-containing alloys in aerospace applications."); Ex. 1008 ¶ 18 ("[T]here is a commercial need in the aerospace industry for thick plate aluminum alloys (200mm or more) that will develop the fatigue and fracture characteristics equivalent to those of thin plates."). However, as Patent Owner notes,

> Dr. Pickens submits that the term "aerospace" is a "very broad field, encompassing not only commercial aircraft, but high speed military aircraft, rockets, cryogenic launch vehicles,

> orbiting manned space craft, satellites, helicopters." Dr. Pickens further submits that the specific combination of properties sought would be application and service-requirement dependent, with some applications requiring high strength and others fatigue resistance, for example.

PO Resp. 23 (citing Ex. 2043 ¶ 40). Dr. Pickens testified further that to successfully design a thick plate composition from a thin sheet, one of ordinary skill in the art "would have had to explore a large test matrix of composition variables and thermomechanical processing variants" and performed "significant mechanical testing" to arrive at "the specific combination of UTS, TYS, SCC resistance and toughness that was attained in sheet or thin plate." Ex. 2043 ¶ 18. Because "this can be a complicated, costly, and an unpredictable endeavor," Dr. Pickens stated that "[b]ased on my more than 30 years of experience in industry, one should have a specific service requirement in mind when attempting to design an alloy, given the sheer number of different applications in the aerospace industry." *Id.* Based on the record before us, we find Dr. Pickens's testimony to be persuasive.

Given the complexities involved in developing a thick plate composition from a thin sheet, and the breadth of potential applications within the aerospace industry, we determine that Mr. Balmuth and Dr. Starke fail to provide sufficient reasoning as to why one of ordinary skill in the art would have attempted to manufacture thick plates having the claimed properties from the thin sheets described in the prior art. *See, e.g.*, *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1348–49 (Fed. Cir. 2014) (holding expert testimony to be impermissible hindsight for failing to explain what reason or motivation one of ordinary skill in the art at the time of the invention would have had to place the prior art together).

In an obviousness determination, we must avoid analyzing the prior art through the prism of hindsight. Instead, we must "cast the mind back to the time the invention was made" and "occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *W.L. Gore & Assoc., Inc. v. Garlock*, 721 F.2d 1540, 1553 (Fed. Cir. 1983). Here, Petitioner attempts to imbue one of ordinary skill in the art with knowledge of the claimed invention, when there is insufficient evidence of record to convey or suggest that knowledge. Rather, Petitioner's arguments that a person having ordinary skill in the art would have only needed to use routine experimentation to manufacture a thick plate alloy having the claimed properties appears to be premised on Petitioner's knowledge of the '509 patent itself. *See, e.g.*, Pet. 20 ("In this case, the '509 patent confirmed that the chemistry in the Balmuth1 reference relating to sheet material could be used for plate products without adjusting the chemistry to arrive at the beneficial strength and toughness properties using merely routine testing procedures.").

Petitioner's contentions that it would have been obvious to try to manufacture thick plates having the claimed properties and that "one of ordinary skill in the art had a 'good reason to pursue the known options within his . . . technical grasp'" to do so similarly are insufficient. *See* Pet. 22; *id.* at 21–24. The Federal Circuit has held that "a finite number of identified, predictable solutions" may support an inference of obviousness, but "[t]o the extent an art is unpredictable, as the chemical arts often are, *KSR*'s focus on these 'identified, predictable solutions' may present a difficult hurdle because potential solutions are less likely to be genuinely predictable." *Eisai Co. Ltd. v. Dr. Reddy's Labs., Ltd.*, 533 F.3d 1353, 1359

(Fed. Cir. 2008) (citing *KSR*, 550 U.S. at 421 ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has a good reason to pursue known options within this or her technical grasp.")). As set forth above, we credit Dr. Pickens's testimony that designing a thick plate alloy product having the claimed properties from a thin sheet alloy product would be costly and unpredictable. Accordingly, Petitioner has not shown sufficiently that a person having ordinary skill in the art would have considered it obvious to try to manufacture a thick plate composition with the properties recited in claim 10 of the '509 patent.

On the record before us, we find that Petitioner has not shown that Balmuth1, the Starke Reference, or the combination of '662 Balmuth and '910 Pickens renders the challenged claim unpatentable. Therefore, we conclude Petitioner has not demonstrated by a preponderance of the evidence that claim 10 of the '509 patent would have been obvious over Balmuth1, the Starke Reference, or the combination of '662 Balmuth and '910 Pickens.

*D. Objective Indicia of Nonobviousness*

Patent Owner contends that Petitioner fails to meet its burden of showing unpatentability because objective indicia of nonobviousness indicate that the claimed subject matter would not have been obvious. PO Resp. 45–52. As discussed above, we find that Petitioner has not demonstrated that claim 10 would have been obvious over Balmuth1, the Starke Reference, or the combination of '662 Balmuth and '910 Pickens. Thus, we need not address Patent Owner's evidence regarding secondary considerations of nonobviousness.

## III. CONCLUSION

For the reasons given, we are not persuaded that Petitioner has shown by a preponderance of the evidence that claim 10 of the ’509 patent would have been obvious over Balmuth1, the Starke Reference, or the combined teachings of ’662 Balmuth and ’910 Pickens.

## IV. ORDER

In consideration of the foregoing, it is

ORDERED that Petitioner has not shown by a preponderance of the evidence that claim 10 of the ’509 patent is unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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